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NURSING OF TROPICAL DISEASES—PLAGUE

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PLAGUE

Sir Patrick Manson defines plague as "A specific, inoculable and otherwise communicable disease, common to man and many of the lower animals. It is characterized by fever, adenitis, a rapid course, a very high mortality and the presence of a specific bacterium, *bacillus pestis*, in the lymphatic glands, viscera and blood. In a large proportion of cases buboes form in the groins, armpits or neck."

Historical.—Thucydides describes a great plague at Athens in the year 430 B.C. at the end of the first year of the Peloponnesian war. He says:

The disease began south of Egypt in Aethiopia, thence it descended into Egypt and after spreading over the greater part of Libya and the Persian Empire it suddenly fell upon Athens. The physicians were among the first victims as they oftenest came in contact with it. There was one circumstance in particular which distinguished it from ordinary disease. The birds and animals which feed on human flesh, although so many bodies were lying unburied, either never came near them or died if they touched them. The crowding of the people out of the country into the city aggravated the misery; and the newly arrived suffered most, for having no houses of their own but inhabiting in the height of summer stifling huts, the mortality among them was dreadful and they perished in wild disorder. The dead lay as they had died, one upon another, while others hardly alive wallowed in the streets and crawled about every fountain craving water. The temples in which they lodged were full of the corpses who had died in them.

The next authentic account of plague refers to that which started in Egypt in 542 A.D. and spread throughout the Roman Empire. Gibbon says, "It wrought the most dreadful loss of life and did not spare the person of the Emperor himself." But as is the case in modern times, the sanitary surroundings and good care which the Emperor was able to command saved his life. The disease raged for 50 years, devastating the whole empire.

In 1563, a terrible epidemic of bubonic plague broke out in Italy, extending to Germany where not more than one tenth of the population escaped the so-called, "Black Death." Boccaccio gives an illuminating description of this epidemic and of the havoc wrought inside the walls of the city of Florence, where 100,000 people perished between

¹ The author's thanks are due to Dr. C. A. Bentz of the University of Buffalo for revising these notes.

March and July. He states positively that many other animals were as susceptible to plague as man and describes the death of two pigs which acquired the plague by rooting about among discarded clothing from a plague patient.

Plague appeared in England as a great epidemic in 1664, when whole villages were depopulated and 70,000 of the 460,000 inhabitants of the London of that day perished. It was finally eradicated by the great fire which destroyed a large part of the city of London. Since that time, plague has not visited England except among sea-men or persons recently from foreign parts until 1910, when several fatal cases in man occurred in Norfolk. On the continent it occurred again and again, until 1841, when it appeared for the last time in Constantinople. Egypt has been a favorite haunt of plague since the earliest times.

Plague is endemic in China in the providence of Yunnan and the recent epidemic, which reached even to our own shores, probably originated there. This epidemic caused the death of 60,000 persons in Canton; from Canton it spread to Hongkong, Shanghai, Manila, and Japan. It was carried in ships to Calcutta and spread to other parts of India where its victims are numbered by the millions. The Indian official returns report 842,000 deaths in the year 1911. This epidemic carried the plague to Australia, Cape Colony, Brazil, Mexico, San Francisco, Havana, and New Orleans. This is the first time it has been known to appear on the western hemisphere.

It will be seen from the foregoing history that plague is not, strictly speaking, a tropical disease, but one which flourishes wherever famine, filth and overcrowding are sufficiently pronounced. At the present time these conditions are more likely to be met with in tropical or sub-tropical countries than in more temperate climates.

The specific cause of plague is the *cocco-bacillus* discovered by Kitasato and Yersin in 1894. The bacillus occurs in the spleen, liver, kidneys, intestines, lungs, bronchi, and in great numbers in the characteristic buboes. It is present in the blood, urine, feces and Dr. Strong states that it is present in almost pure culture in sputum of patients ill of pneumonic plague.

Man may be inoculated by bubonic plague as has been proved by intentional and accidental inoculation. Fatal plague was accidentally acquired in a Vienna laboratory in October 1898 from handling plague cultures. Many of the lower animals, as marmosets, ground squirrels, gophers, mice, guinea pigs, rabbits, hens and turkeys are always killed when successfully inoculated with plague. It is by means of the flea that bubonic plague is most frequently spread from rat to rat, and from rat to man and other animals. *Bacillus pestis* multiplies in the

stomach of a flea and is passed out in the feces so that the flea acts as a multiplier as well as a carrier of disease.

In the *Journal of Hygiene*, Supplement Volume 4, January 1, 1915, A. W. Bacot, Entomologist of Lister Institute of Preventive Medicine, reports:

1, Fleas (*ceratophyllus fasciatus*) are able to carry *bacillus pestis* for periods up to 47 days in the absence of any host and subsequently to infect a mouse.

2, Infected fleas starved for 47 days and then placed upon a mouse may not infect it for a further period of about 20 days.

3, There is no reason to suppose that the positive results obtained in these feeding experiments represent the limit of time after which infection may take place, but indicate that plague infection may persist in fleas for one or two months in cool weather and subsequently give rise to an epizootic.

In the same issue he reports that

bites of bugs (*cimex lectularius*), which had been allowed to feed on plague material were kept for 48 days without feeding. Five bugs survived this test and were allowed to bite a mouse. The mouse died five days later from typical pest.

This experiment suggests that other insects are dangerous carriers of plague.

Symptoms. The period of incubation in man is from four or five hours to fifteen days, commonly five to eight days. A prodromal stage is seldom present, but occasionally the disease is heralded by giddiness, chilliness, pain in the groin, mental depression and aching limbs.

Stage of invasion. Frontal or occipital headache, aching limbs, vertigo fever, drowsiness, the features are drawn and haggard. The eyes are sunken and bloodshot, with dilated pupils.

Vomiting is sometimes very frequent. Some cases have diarrhoea, others have marked constipation. The patient is depressed and unhappy. In a few hours or at most a day or two the temperature rises to from 104 to 107°F. Pulse is correspondingly increased; at first full, later becoming small, fluttering and intermitting. Respirations are rapid; the skin is dry and flushed; the face is swollen; the eyes are stary; the tongue is swollen and covered with a white fur, which becomes dark brown in a few hours; the teeth and lips are covered with sordes and the breath is foul. Thirst is constant and intense; voice almost lost. There may be a wild or a low muttering delirium with picking of the bed clothes, or the patient may sink into a state of stupor. The urine is scanty or suppressed; convulsions may occur. The buboes usually develop in from 12 to 24 hours, but may be delayed four or five days. They occur most commonly in the right groin; less often in the axillary glands and occasionally in the glands at the angle

of the lower jaw. The last is usually seen in children. The buboes are generally single; sometimes they occur simultaneously in different parts of the body. They vary in size from one to two inches in diameter. The pain is very severe. If death does not occur, the bubo continues to enlarge and soften, bursts and discharges very vile-smelling pus. In rare instances, the buboes do not suppurate. In some cases small patches of moist gangrenous skin develop on different parts of the body, which may slough and lead to extensive gangrene. Purple or dull red spots, sometimes as large as a penny, are frequently found on the skin, scattered over the exposed parts of the body, especially on the face, hands, and legs. Hemorrhages from nose, mouth, lungs, kidneys, or bowels may occur and are usually thought to indicate unfavorable prognosis. Pregnant women abort and usually die. When convalescence occurs, it may begin between the sixth and the tenth day or it may be delayed until the fifteenth or the eighteenth day. It generally begins with profuse perspiration, the temperature begins to fall, pulse and respiration become normal, and the patient returns to consciousness.

Convalescence is apt to be slow; sloughing, suppuration, and other complications nearly always occur and it may be months before the patient is entirely well.

Fatal terminations take place between the third and the fifth day but may come at any time in the course of the disease. Post mortem rise of temperature often occurs.

Treatment. Every locality has its favorite treatment, but they are all symptomatic, with the exception of the vaccines; some of these, notably Haffkines's, are of value as prophylactics. Stimulants of various kinds are given in collapse especially strychnia which is usually administered early. The most desperate cases sometimes recover and the nurse should bear this in mind before abandoning hope of resuscitating a dying patient. Morphia is given as a hypnotic and to relieve pain, dose $\frac{1}{8}$ to $\frac{1}{2}$ grain every 12 hours. Diarrhoea is sometimes treated with salol, gr. x, every 4 hours. Sometimes it is not treated at all, especially when not too urgent. The buboes are usually poulticed at first and when softened they are incised and dressed. Some physicians prefer to treat them with an ointment of glycerine and belladonna.

Nursing. The patient must be isolated in a clean, airy room from which every object not essential has been removed. All walls must be first brushed and all floors washed with corrosive sublimate, 1 to 1,000, to kill fleas, then the patient is placed in bed and is kept as quiet as possible. Tepid baths are usually given every two hours while the fever continues and the daily sponge with soap and water is always

given unless the skin be so covered with cutaneous haemorrhagic effusions as to suggest its discontinuation in whole or in part. Ice bags placed at the head and throat relieve pain and fever. Diet is liquid, consisting of albumin water, peptonized milk, broths, etc. Where canned milk is used, care must be taken to dilute it well before giving, to prevent vomiting. Water must be given in abundance and the nurse will do well to give this at regular intervals as the thirst is usually very intense, and the patient too weak to ask for water. In the great epidemics, where the patients receive no care, the few who survive always tell the same tale of their intense suffering from thirst. It must never be forgotten that the clothing of the patient, the bedding, utensils used, the excreta and everything which comes in contact with the patient may convey the disease. It is necessary, therefore, for a nurse to exercise great care in the disinfection of such materials. All carriers, such as flies, fleas, bedbugs, etc., must be excluded from the sick room. If the latter is not screened, a mosquito netting may be placed over the bed to keep the flies from the patient. All excreta must be covered while disinfection is being carried out. The nurse must never relax her vigilance in regard to disinfection, for the sores which follow plague abscesses and buboes may convey infection until healed; which may not be for several weeks or months.

American or European nurses seldom contract plague in the regular isolation hospitals, where the nursing is systematized and the nurses are not on duty too many hours at a time. Eight hours a day, in broken periods of four hours each, is as long as a nurse should expose herself in a closed room. In the tropics, however, where the ventilation is so much better than in colder climates, the length of time on duty is not so important, provided one does not become over-tired. Even the slightest pin prick on the skin is dangerous and should be protected by painting with tincture of iodine. Practical experience has shown that the one important thing for the nurse to do for personal prophylaxis is to wash her hands very frequently in a germicide, preferably alcohol.

These remarks refer to the bubonic form of plague. The pneumonic and septicemic forms always prove fatal and the nursing consists only in making the patient comfortable and in preventing the spread of the disease.

The personal prophylaxis in the pneumonic form consists in the precautions mentioned and in the wearing of a mask made of cotton flannel, completely enveloping the head and shoulders, tied about the neck and having windows of celluloid. This mask was copied from pictures of physicians of the middle ages. The nurse is cautioned

against raising this mask for even one moment, as it was found by experiment that plague bacilli were always present in the droplets emitted during coughing or forcible expiratory efforts. The following is a description of an epidemic of pneumonic plague.

PNEUMONIC PLAGUE

In the winter of 1910 and 1911, a very extensive epidemic of pneumonic plague occurred in Manchuria. Dr. Richard P. Strong and Dr. Oscar Teague went to Mukden and studied the plague at the plague hospital of that city. The results of their studies may be read in the Report of the International Plague Conference and in the *Philippine Journal of Science* for June, 1912.

Both sexes seem equally susceptible but the proportion of females and children attacked during the epidemic was comparatively small, as women and children were evidently not so frequently exposed to infection. The disease prevailed particularly among the poorer classes, coolies, etc., the majority of whom were between 20 and 40 years of age.

Symptoms. The onset of the disease is usually abrupt; prodromal symptoms are rare. The disease usually begins with chilly sensations but a distinct rigor generally does not occur. Epistaxis is generally not present. There is headache, loss of appetite, an increase in the pulse rate and fever. Vomiting rarely occurs. Within from 24 to 36 hours after the onset, the temperature usually has reached 103 or 104° F. and the pulse 110 to 130 beats per minute. Cough and dyspnoea usually appear within 24 hours after the onset of the first symptoms. The cough is usually not painful. The expectoration is at first scanty but soon becomes more abundant. The sputum consists of mucus which shortly becomes blood tinged. Later the sputum becomes much thinner and of a bright red color, it then contains enormous numbers of plague bacilli in almost pure culture. The typical rusty sputum of croupous pneumonia has not been observed. The conjunctivae become infected and the tongue coated with either a white or a brownish layer. The expression is usually anxious and the face assumes a dusky hue. Labial herpes has never been observed. The patients sometimes complain of pain in the chest but usually this is not severe. Apart from the disturbances due to the dyspnoea and their anxiety for their condition; they usually appear to suffer but little and usually do not complain of pain. In the later stages of the disease the respiration becomes greatly increased and the dyspnoea is usually very marked; the patients frequently gasp for breath for several hours before death. Cyanosis is then common. The signs

of cardiac involvement are always marked in advanced cases, the pulse becoming gradually more rapid, feeble and running; finally it cannot be felt. Gallop rhythm of the heart sounds are frequently observed. Death takes place from cardiac paralysis and exhaustion. The patients frequently succumb after slight physical exertion, such as sitting up in bed to take nourishment or on being moved. A few hours before death, the temperature often declines to below normal. Delirium and coma are frequently present before death. The urine in the later stages may show the presence of albumin. Bloody diarrhoea is occasionally observed. In the primary septicaemic cases, the course of the disease is very rapid. There may be no manifestations of disturbances of the lung. The cardiac symptoms are very prominent. The patients soon pass into a comatose condition and die. The duration of the disease is usually less than two days, though many cases did not live longer than sixteen hours after the onset of the symptoms. Cases sometimes survive for three and, more rarely, for four days. In no case reported was the duration over one week.

Prognosis and treatment. No method of treatment appeared in any way to have been successful. Treatment with serum seemed, in a few instances to have prolonged the illness.

THE RELATION OF MENTAL TO PHYSICAL WELFARE IN A PATIENT¹

By JANE P. COX, R.N.

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In our war with sickness, the mind suffers as well as the body, and I venture the statement that, with all our superb equipment to minister to physical needs, most of the failures of good physicians and nurses are due to their ignorance of or indifference to the patient's mental needs.

Let us consider first that most easily-determined of the patient's psychic processes, his attitude, by which I mean his behavior or conduct. It is this relation to sickness and treatment which we should understand and be able to influence.

Illness is an abnormal condition. How quickly the spirits droop under the touch of even a mild illness. The body is a sensitive instrument, sensitive to every touch of the mind. We do not question today the direct and positive influence of the mind upon the circula-

¹ Read at the fifth annual meeting of the Mississippi State Association of Graduate Nurses, October 29, 1915.